Hyperion EOS0610iDUOII Charger - User's Manual

Visit http://media.hyperion.hk/dn/eos for the newest manuals, firmware, and software

Warnings:

The EOS 0610i DUOII is a carefully-designed charger with many built-in safety features, such as reverse polarity protection, input voltage error warning, and cell-count mismatch warnings for lithium chemistry batteries. HOWEVER, IT IS THE RESPONSIBILITY OF THE USER TO INSURE THAT THE CHARGER IS CONFIGURED AND USED IN A SAFE MANNER IN PROPER ENVIRONMENT.

- Always be sure that the charger is properly configured for the correct battery type
- Be sure that your lithium battery pack balance connector matches the multi-adapter type connected to the charger.
- SYNC MODE charging should start with packs at nearly equal discharge states (see more details in text)
- Be sure that the batteries you charge are capable of charging at the rate you select
- Never charge batteries unattended
- Charge only in a fire-resistant environment, non-flammable surfaces such as on concrete or brick
- Do not charge near easily flammable materials
- Do not charge batteries inside a model
- Charging outdoors is recommended whenever practical
- Use only high-quality gold 4mm bullet connectors for charge output cable connection to the charger. See "setup"
- Properly insulate and regularly inspect all connectors to eliminate the possibility of short circuit. Damage caused by output short circuit is not covered by warranty.
- Never allow the charger case to contact an AC/DC power supply case while powered
- Do not drop or cause other shock to the charger, nor subject it to moisture, condensation or liquids
- Do not attempt to charge battery packs made from different types of cells, a mixture of old and new cells, or cells made with chemistry not supported by the EOS 0610i DUOII
- NEVER attempt to charge "non-rechargeable" cells
- Do not open the case of the charger under any circumstances. Doing so will void the warranty
- Keep the charger away from children or pets at all times.
- **NEVER ATTEMPT TO CHARGE A SINGLE BATTERY ACROSS BOTH PORTS.** (example: a "single unit" 10S pack) DOING SO WILL DAMAGE THE CHARGER, BATTERY, AND WILL VOID YOUR WARRANTY.

DUOII is designed to charge single packs up to 6S max.
For flight packs larger than 6S, DUOII supports SYNC MODE charging of two packs to make a single series-wired flight pack. (so 2x2S=4S up to 2x6S=12S series flight packs are possible)

PUT SAFETY AHEAD OF ALL OTHER CONSIDERATIONS!
SEEK MEDICAL ATTENTION IN EVENT OF ANY INJURY!

Specifications & Features:

- 180W Per Port for 360 Watts Max CHARGE Output
- 0.1A to 10.0A max Charge Current in 0.1A steps
- 50W Per Port DISCHARGE with 10A Max Current
- STORE MODE allows fast and simple discharge to 60% capacity for proper storage of Lithium Battery types = longer battery life.
- Charges/Discharges 1 to 6 cells Lithium Polymer Batteries Per Port (3.7V/cell nominal types)
- Charges/Discharges 1 to 6 cells Lithium Ion Batteries Per Port (3.6V/cell nominal types)
- Charges/Discharges 1 to 6 LiFePO4 (A123) cells (LiFePO4 3.3V/cell nominal, A123 3.3v support)
- Charges/Discharges/Cycles 1-16 cell NiCd/Ni-MH in three modes: Normal, Linear, and Automatic
- Charges/Discharges 1~12 cell Lead Acid Batteries (Pb, 2V/cell)
- Allows Lithium-Type batteries to 50,000mAh and PB (lead/acid) batteries to 100Ah capacity
- Two built -in Hyperion LBA10/300 Balancers with 10A max rating and 300mA max balance rate/cell
- TCS - Terminal Capacity Selection
- Rich Data Displays during and after charging and balancing
- PC Port for Data Logging and Firmware upgrades
- Temperature Sensor Ports & Temp Stop settings*
- Wide Voltage Input Range 11v~28v for higher efficiency when charging high-voltage packs, and compatibility with a wider selection of AC/DC power supplies
- Power Supply Amperage Control to allow reliable charging with lower-output power supplies
- Power Supply Voltage Control (PS Load Control) works in concert with Amperage control to insure the charger does not overload your power supply
- Adjustable Power Sharing % between Outputs
- Input Cable with 4mm Male Connectors + Clamps
- Output Cable Set Included, with 4mm Connectors
- Two, Integral, Thermostat-Controlled Cooling Fans
- Rugged Aluminum Case with Insulating End Caps
- 2-Line, 16-Character, Yellow Backlit LCD Data Display. Highly visible in all conditions
- Total of 20 User-definable Memory Positions
- Firmware upgradable via Win PC **

* Temp sensors available separate: #HP-EOSTMPSEN or EOS1210i-SEN
** Firmware upgrades require USB Adapter #HP-TI-PRGUSB and harness #HP-EOS06-PCCBL. Firmware upgrades will only become available if and when improvements are identified in future.

HIGH RISK CHARGING ADVISORY
Avoid charging batteries indoors. If you must charge indoors – or any place injury to persons or damage to property could occur in the event of fire – then be sure to:
* Keep battery well away from flammables (2 meters or more)
* Contain battery in a heavy fireproof container (such as a brick box)
* Always monitor the charge
HYPERION ACCEPTS NO RESPONSIBILITY FOR DAMAGE OR INJURY FOR INDOOR or other HIGH RISK CHARGING ACTIVITY

GENERAL SETUP and NOTES

The EOS0610iDUOII comes with male 4mm Bullet connectors (aka 'banana plugs') attached to the power INPUT cables. These cables are appropriate for attaching directly to most high-quality AC-DC power supply units, such as the BK Precision (USA) model 1692(15V, 40A, 600W). Also included are large Terminal Clips with matching 4mm female bullet connectors, for attaching directly to 12V~24V lead-acid batteries.

Output side 4mm Male Connector + Cable assemblies (#HP-EOSOUTCORD x2) are also supplied. Carefully solder your preferred battery connector to the free ends, with correct Red (+) / Black (-) Polarity. If you make up additional output cables, note that MINIMUM inner cable diameter should be 2.5mm (14ga) and MAXIMUM cable length is 20cm (8").

It is critically important that you use either a fully charged 12V~24V lead-acid automobile battery (or better, deep-cycle marine battery) - or a high quality AC-DC power supply in the range of 12V to 28V DC output, with minimum current rating of 10A. When charging high voltage batteries at high current (charger output 360W) the AC/DC Power Supply (PS) should be 15V minimum with rating of 350W or more, to insure reliable performance. Note that PS load control features DO allow you to use lower-rated power supplies reliably, but that total charger output wattage will be limited accordingly. (See details later in this manual).

If you have any trouble charging after confirming that input and output cables are properly connected and of the proper materials, be sure to check the charger on an automotive battery. Many problems are associated with poor quality or inadequate switching AC-DC power supplies. Use PS Load control as needed to reduce load on your PS, or upgrade your PS.

If, after carefully reading the following pages on usage, you have any difficulty using the charger please refer to the troubleshooting guide and warranty terms at the end of these instructions. It is best to carefully check your charger before making a return, as problems in setup, cabling, or power supply are much more common than defects in the charger. Chargers returned by the user and later found not defective will only be returned to the user at the user's expense and may incur a service charge.

Memory Positions for Charging, and Settings per Battery Type

Ten *MEMORY* positions - On Each Channel - M0 to M9 - allow you to set parameters for CHARGING your packs, such as BATTERY TYPE [NiMH, NiCd, LiPo, LiIon, LiFePO4, (A123), Lead-Acid], battery CAPACITY, Charge RATE, Cutoff Voltage, Temperature, and more.

BATTERY CHARGING - Let's try it once to learn it….

(Example: LiPo battery with balance connector. Follow the flow charts as you go…)

MODE: *Before Charging/Discharging is started:* Scrolls between MENUS for MEMORY (Charging), USER SETUP, DATA VIEW, BALANCER. MODE also selects SOLO and SYNC modes for charging packs greater than 6S

MODE: *During Charging/Discharging:* Scrolls between VIEW MODES: MEMORY, DATA VIEW, And DATA QUICK VIEW screens.

UP / DOWN: Scroll through the settings within Menus, Data Views, and Selects values for Settings

ENTER: Selects any Setting to CHANGE / Charge START / Charge STOP

CH: (not pictured left) Selects which screen you are reading: Port #1 or Port #2.

Attach the charger to an appropriate DC power supply. Connect the Output Cable 4mm bullet connectors to the Red (+) and Black (-) CH#1 output port on left side of the charger. Connect your Battery Main Connector to the Mating Connector you have previously soldered to the Output Cable set. Connect your **Lithium Polymer battery** Balance Connector to the EOS Balance Multi-Adapter. ALWAYS USE THE BALANCER(s) WHEN CHARGING LITHIUM BASED PACKS FOR SAFETY!!
(See end of these instructions for more information and balance multi-adapters for various brand lithium packs).

Note: Always connect the Output Cable set to charger first, then battery. After charging is finished, always disconnect the Battery main wire connectors from Output Cable set first, then disconnect Output Cable set from charger.

After the Welcome screen, the charger will start on CH#1 and display the most recently used memory position.
(see flowchart (2) MEMORY DISPLAY at this time)

Press **CH** to select which charger or port screen you are reading, '1 or 2' will be shown in the top, right-hand corner
Pressing **ENTER** once will make the Memory Position start flashing. Flashing values can be changed with **UP** / **DOWN** keys.
While Mem Position is flashing, Press **DOWN** to scroll through the ten available memory positions.
Press **ENTER** again to confirm the memory position that you wish to use.
From the memory screen, now press **DOWN** to get to *BATT TYPE*, press **ENTER** to start *BATT TYPE* flashing for selection.
Press **DOWN** until you see your desired Battery Type (LiPo in this case). Press **ENTER** to confirm.
Press **DOWN** again to select Pack Voltage which matches your battery

Note: the Charger shows both pack voltage and the number of cells in Series (S) on this screen, matching the Voltage and Battery Type you have selected. If the "S" and the Voltage **don't** match your battery, you have the **Wrong Battery Type** selected (like confusing LiIon 3.6v with LiPo 3.7v types). Use **UP** key to reach *BATT TYPE* again, and reset *BATT TYPE* properly.

Press **DOWN** to get to *BATT CAPACITY*; press **ENTER** to make the mAh value flash and adjust with the **UP** or **DOWN** buttons until it matches your battery, by increments of 100mAh (to max of 50,000mAh). Press **ENTER** to confirm.

If your battery is 730mAh, for example, you could set this to 700mAh. The default CHARGE RATE (set in next screen) for lithium is 1C of capacity (equal to 0.7A for a 700mAh setting). But RATE is adjustable independently up to 2C for lithium, so the *BATT CAPACITY* setting mainly provides additional safety.

Press **DOWN** to get to *CHG CURRENT*. This is limited to 2C with respect to the battery capacity for Lithium Polymer (LiPo 3.7v/cell types) and Lithium Ion (LiIon 3.6v/cell types). ***CAUTION!*** For other cell types, there is no restriction, up to the 10A limit of the charger, so BE SURE you know what *CHG CURRENT* setting to use for your battery (see also below text on cell types).

Press **DOWN** to *TEMPERATURE CUT-OFF*. Requires option part #HP-EOSTMPSEN or #HP-EOS1210I-SEN, temp sensor. This is most often used by advanced users for NiMH charging. The Default setting is 50 degrees Celsius.

Press **DOWN** to *SAFETY TIMER* - Adjustable between 20 and 300 minutes. An alarm will sound during charging after selected time interval during charging has elapsed. Set the time for about 30% longer than it should take your pack to charge. Keep in mind that a badly balanced pack may take longer than normal to charge, so don't set this too tight. A Lipo pack at 1C rate might take as much as 120 minutes to charge, so timer of about 160~180 minutes may be appropriate. Note that while other safety checks based on capacity and voltage are also working for you, charging should never be left unattended in any case.

Press **DOWN** to *TCS CAPACITY* – For LiPo and LiIon battery types Terminal Capacity Selection is available from 50% to 100% of pack capacity. During the charge, the EOS 0610i DUOII will continually estimate capacity in the pack, and either terminate the charge or sound a signal tone (and continue charging) when your selected TCS percentage is reached, depending on the value for you set for *TCS END ACTION*. See end of manual for more details on TCS.

Press **DOWN** to *TCS END ACTION* – Values are CONTINUE and STOP. CONTINUE is the default. In this case, when TCS% is reached for settings 50% to 95%, the charger will "beep" 10 times, but continue charging to 100% until stopped. If TCS ACTION is set to STOP, the charger will stop charging at that TCS setting and - if balancing is complete – then give COMPLETE (END) Buzzer according to you buzzer settings. (or continue till balanced, then give End buzzer).

Press **DOWN** to *DSCH CURRENT* – If you'll be discharging, you'll set the discharge current here. Note that depending on the voltage of the pack, the current you set may not be obtainable if the total Volts multiplied by Current (A) exceeds 50W.

Press **DOWN** to *DSCH VOLTAGE* per cell – Lithium types should only be discharged for storage, so we recommend that you use STORE MODE for that. Otherwise, you need to be sure of the V/cell setting yourself, according to your battery type. Over-discharge can damage packs.

Pressing **DOWN** for a last time returns you to the 'Memory Select' screen.

At this point, see flowchart **(7) LiIo / LiPo / A123 BATTERY START**. Holding the **ENTER** key pressed down for two seconds or more will start the CHARGE, STORE, or DISCHARGE process (select with UP/DOWN Keys) for LiPo, LiIon, and A123 types, no matter where in the MEMORY (CHARGE) screens you may be. Additionally- if balancer circuit is connected – SYNC MODE is available via ENTER (short push) and UP/DOWN arrow keys.

With "CHARGE START SOLO MODE" selected, hold down **ENTER** for 2 seconds. Hold down **ENTER** again, the charger will then read **BATTERY CHECK** and then ask you to confirm the number of cells in your battery pack. Press **ENTER** (short press) for a final time to start charging. (if balancer is connected, a 10-second countdown occurs, then auto start).

Note: If the Lithium-based pack is NOT connected to the balancer port, the Charger will read NO BALANCER. We strongly recommend using the balancer at ALL times.

Holding down **ENTER** (2 seconds) at any time while charging a battery will then **STOP** charging (or discharging, etc…).

MODE SELECTIONS

Before Charging/Discharging/Store are in progress, Pressing the MODE button will scroll you through the MEMORY, DATA VIEW, BALANCER and USER SETUP screens, allowing you to change parameters as you like (see charts for each)

During Charging/Discharging/Store , Pressing the MODE button will scroll you through the MEMORY, BALANCER and QUICK VIEW Data screens. (see chart *(9) OPERATION and FINISH DISPLAY*)

* MEMORY – Short-press **UP**/**DOWN** buttons to scroll through the data presented. At the top memory screen (showing C: A), you can press **ENTER** and **UP**/**DOWN** to change charge current if desired. You can also LONG-press (2-seconds) **UP** button to see each screen presented in turn at two-second intervals.

* BALANCER – **UP**/**DOWN** buttons to see detailed information on cell balancing, and individual cell voltages

* QUICK VIEW – Shows the following useful info on a single screen:
  CAPACITY mAh/Ah (Charged in "C" or Discharged out "D")
  INPUT VOLTAGE (Vi)
  PACK VOLTAGE (V)
  CHARGE CURRENT (A)
  CAPACITY (%) of the pack at current time.

---- DATA VIEW
Press the **MODE** button until you reach the *DATA VIEW* screen. (see chart (3) Data View Display)
Use the **UP** or **DOWN** key to scroll through the various information presented:

**INPUT* – Current input voltage from the power supply
**OUTPUT* – The output voltage of charger while charging, or pack voltage of the battery while connected but not charging
**BAT. RES* – The internal resistance (IR) of the battery pack in mΩ.
(IR value appears some seconds after charge is started, and will become more accurate as charge progresses)
**TEMP* and *PEAK TEMP* – Current Temp, and Peak Temp recorded during the charge (requires optional temp sensor)
**CHARGE TIME, CHARGE CURRENT*
**PEAK CHARGE VOLTAGE*
(see chart for other information screens available under Data View)

---- BALANCER MODE (Lithium types only)

Try it out with a LITHIUM battery pack which has the proper Balance Connector attached. Attach the charger to an appropriate DC power supply, and connect your battery pack's main and balance connectors to charger as previously described.

Press the **MODE** button until you reach the *BALANCER* Mode screen.

*Press **DOWN** once to reach the SELECT VOLTAGE screen. This screen simply shows you a very accurate voltage for each cell in the pack, in turn. You will see [1CL] at upper right, and a voltage displayed below, to three decimal places; for example: 3.982.
*Press **ENTER** to make the [1CL] flash, and **UP** to see the voltage for the second cell, third cell, etc…
*When you have seen the voltage for the last cell in the pack, press **DOWN** to reach the next screen:
AVG. V shows the **average** voltage per cell, across the whole pack.
V. GAP shows the **difference** between the highest and lowest volt cells in the pack
*Press the **DOWN** button to reach the next screen, which shows voltage for every cell in the pack to two decimal places (e.g. 3.98).

Press **ENTER** for two seconds. You will see *BALANCE START / SOLO MODE* - SYNC MODE
--- **If you are using a single port only. Use UP or DOWN to select SOLO MODE.** Hold down the **ENTER** button, the charger will check the battery, and then ask you to confirm the number of cells in the pack. If correct, press ENTER once to start balance charging.
--- **If you are using both ports**, and want to balance two packs (of same type and capacity,) as a single unit – such as 4S VX3700 and 5S VX3700 to make a 9S series-connected flight pack –hold down the **ENTER** and **DOWN** key to change from SOLO MODE to SYNC MODE. Hold down the **ENTER** to start *BATTERY CHECK*. The number of cells in each pack will be shown one above the other. If both are correct, press **ENTER** to begin balancing.

After Balancing has begun, you may return (using UP or DOWN keys) to the screen which shows all cell voltages together. Cells which are **higher** in voltage will show the decimal point alternating to a larger square shape, indicating that these cells are being discharged, while the lower voltage cells are not. Hold down the **ENTER** to stop balancing at any time.

NOTE!! SYNC MODE Charging (selected in similar way to SYNC BALANCING above) is intended to be used only with two packs of the same brand, capacity, type, and lifecycle history! For example, two packs of LVX5000 4S lithium polymer purchased at the same time and used together as a 8S flight pack in series when flying a particular model. At the start of SYNC MODE charging, both packs should be at roughly the same discharge state. Otherwise, you should SOLO MODE charge each pack separately, and when both are done use SYNC MODE balancing before connecting in series for flight.

---- USER SETUP (these settings are "sticky" until you change them again)

Press the **MODE** button until you reach the *USER SETUP* - TEMP MODE screen.
* Press **ENTER** and use **UP** or **DOWN** keys to select temperature display in degrees Fahrenheit or Celsius

Press **DOWN** to scroll through the following screens, and **ENTER** then **UP** or **DOWN** to change settings on each screen:
* *BUTTON SOUND* screen - ON or OFF
* *FINISH SOUND TIME* screen - OFF, ON (continuous), 1 Minute, 15 Seconds, 5 Seconds
* *FINISH SOUND MELODY* screen – Choices 1 to 10 (Will also play each Melody)
* *POWER SUPPLY VOLTAGE* screen – Set to limit max watts INPUT (primary for variable voltage PS units only)
* *POWER SUPPLY CURRENT* screen – Set at the rated CURRENT (A) of your power source [set to 40A if car battery]
* *POWER SHARING screen* - Set the shared power percentage for the two battery outputs (details below)

Power Supply Voltage and Current together comprise PS Load Control. The EOS0610iDUOII is an extremely powerful charger, and can – particularly when charging high-voltage packs at high rate settings - pull more amperage than many power supplies can deliver. To avoid stressing your PS and having charges terminated prematurely, you can tell the charger the rating of your supply, to limit the load on the supply. If you find the PS is still overloaded, reduce the setting for POWER SUPPLY CURRENT until the problem goes away (or buy a stronger Power Supply unit!).

BATTERY CHARGING - EXTENDED DETAIL

Consult the documentation or labels provided with your battery to determine the correct capacity setting. It is very important to get this right, as the charger uses the capacity setting to determine nominal charge rate (amperage), TCS percentage, and safety termination. Incorrect settings could damage the battery, and could even cause an accident.

----- **For Lithium types CAPACITY is selected in mAh**. Selection is in increments of 100mAh. **CURRENT** is set in Ampere (at *CHG CURRENT* screen), so divide mAh by 1000 to get Amperage. For 700mAh, current is 0.7A for 1C, up to 1.4A for 2C max. For 1800mAh, 1.8A for 1C, and 3.6A for 2C and so on. All Hyperion LiPo packs are rated for safe 2C charging. Hyperion does not support nor recommend ever charging Lithium Polymer at rates higher than 2C.

----- **Lithium Polymer (3.7v) vs. Lithium Ion (3.6v)** Please make absolutely sure that you properly identify the type of lithium battery you are charging, the capacity in mAh, and the number of cells wired in series and the pack voltage! Lithium Ion (3.6v nominal) should never exceed 1C charge rate. **Never** charge **Li Ion 3.6V** types by LIPO 3.7V charger mode!

----- A123 / LiFePO4 Cells: The A123/LiFePO4 charge/discharge modes are intended for cells with 3.3V nominal produced by A123 Company, or other-brand LiFePO4 cells which are recognized to be of good quality from well-known makers. In *MEMORY MODE*, choose A123 for *BATT TYPE*, for charging such cells. The A123 charge mode MAY work with "no-name brand" LiFePO4 cells having 3.3V nominal voltage, but Hyperion has found some "knock off" cells in the market of very questionable quality. Customers who use A123 mode (LiFePO4 mode) to charge such off-brand cells assume all risk.

A123 CHG CURRENT (A) setting: The EOS 0610iDUOII does NOT limit max charge rate for A123-type cells or other-brand LiFePO4 based on capacity. For A123-Brand cylindrical Phosphate-based cells it is our position that 4C~4.3C rate is the target MAX, as of this writing. Therefore, 9.2A~10A max for the A123 2300mAh cells, and 4.4A~5.0A for the newer 1100mAh size. Consult battery maker documentation for other brands or later A123 types.

NiCd and NiMH: Set BATT TYPE from MEMORY MODE screen as we did before in the LiPo example. Consult the battery manufacturer's documentation to determine the proper settings for VOLTAGE, CAPACITY, and CHG CURRENT.

In addition to the charge settings we have already seen in LiPo Mode, three additional settings exist for NiCd and NiMH battery types. These are essentially "expert" settings, and should be left at defaults unless you know why you want to change them:
PEAK SENS (peak sensitivity – delta V) – default for NiCd is 7mV/C and NiMH is 5mV/C
TRICKLE – sets a low current at which the charger will continue to charge the pack AFTER normal charge is ended
PEAK DELAY – Short interval after peak is detected during which the charger will continue to charge before terminating

STARTING CHARGE / SELECTING CHARGE TYPE: After setting *MEMORY MODE* charge parameters, holding down **ENTER** takes you to a Sub-Menu with three options for NiCd/NiMH charge type. Press **ENTER** once to start the current setting flashing, and use **DOWN** key to scroll through the three choices. Hold down the **START** button after your selection to start charging.

AUTOMATIC – Essentially ignores your setting for CURRENT, but charges at rate determined by the internal resistance of the battery pack. Especially useful when you don't know what settings you should make due to lack of documentation.
LINEAR – Charges at whatever rate you have selected from start to finish (if the charger detects no problem with settings).
NORMAL – Charges according to your RATE setting but uses an intelligent algorithm to alter current as needed during charge.

Lead Acid Batteries: Set Pb for BATT TYPE, correct voltage at the BATT VOLTS screen and the Ah at the BATT CAPACITY screen, and amperage at the CHG CURRENT screen. Consult the battery manufacturer's documentation to determine these settings.

TCS Feature (Terminal Capacity Selection % for Lithium battery types)

TCS has two settings: TCS CAPACITY %, and TCS END ACTION.
* The TCS CAPACITY Setting is selected from the MEMORY screen by pressing **UP** button four times (or DOWN seven times). TCS Capacity can be set from 50% to 100% in 5% increments (default is 100%, a full charge). The charger uses your setting for Battery Capacity in addition to sophisticated measurements and calculations to make a close estimate for the currently charged capacity in the pack during charging.
* TCS END ACTION can be set to CONTINUE (default) and STOP. If CONTINUE, when TCS% is reached for settings 50% to 95%, the charger will "beep" 10 times, but continue charging to 100% until stopped. If TCS ACTION is set to STOP, the charger will stop charging at that TCS setting and - if balancing is complete – then give COMPLETE (END) Buzzer according to your buzzer settings. (or continue till balanced, then give End buzzer)

There are three good reasons why you might want to charge a Lithium Battery to something less than full capacity:
* The first is for long-term storage. Lithium batteries are best stored after charging to 50%~60% of nominal capacity. However, rather than using TCS for this goal, it is easier and better to always use the STORE MODE function. STORE MODE automatically charges or discharges as needed to reach 60% TCS, then stops.
* The second aim is to get more flight time in during a typical day at the field, by stopping the charge when the battery is 90% to 95% full, for example. Due to the CC/CV method by which LiPo are charged, charging the last few mAh back into the pack takes a LOT more time than the first few mAh did… So if you want to get in the air ASAP, and don't mind a shorter flight then set TCS at 90%~95% could save you a good bit of charge time. In this case we suggest END ACTION setting of CONTINUE, that way the charger will sound 10 beeps when TCS is reached, so you can stop charging and fly. If you don't catch the warning, the charger will continue to charge to full capacity, as a safety measure in case you have forgotten that TCS is set below 100%.
* The third possibility is that evidence suggests that charging to 90%~95% can increase battery cycle life, compared to 100% charges. So in this case set TCS ACTION to STOP.

Lithium Care

To maximize your investment in Lithium Battery packs, do the following:
* ALWAYS Store your packs at 60% of capacity. After a day of flying, use STORE Mode to achieve this. It is especially harmful to store lithium packs fully charged, and should be avoided for more that a day or two at most.
* AVOID discharging cells beyond 90% of capacity (80% is even better). NEVER fully discharge lithium packs.
* STORE your packs in a cool, relatively dry location.

Charging Lithium Polymer in Excess of 1C Rate (3.7v Nominal LiPo types)

Every Hyperion lithium polymer battery ever produced is capable of charging in excess of 2C.
Note: These are the charge C rates for which less than 0.3% degradation was found in Hyperion Lithium Packs:
HP CX: 3.0C, HP VX: 3.0C, HP VZ: 3.0C
(50-cycle tests completed at 1.0, 2.5, 2.75, 3.0C rates, 0.3% is within measurement error , so not significant, esp if charged at lower rate)

If 3C is possible, Why not 3C?
2C is the sensible limit for fast charging lithium polymer. Due to the CC/CV nature of the lithium charging process, the returns from increasing charge rate diminish very quickly after 2C. That is, **total charge time is only a couple minutes shorter** at 3C compared to 2C, yet initial charge rate has to increase 50% for that small gain. Given this, the risk/benefit equation lands squarely on the side of 2C max rates. Additionally, since many batteries are not capable of charging reliably past 2C, chargers which do allow 3C charging are much more likely to cause damage to batteries, or even accidents. It is simply too easy to make a mistake with the Charge Rate setting, and there are no electronic safeguards which can be reliably employed against making such a mistake. **If using other than Hyperion lithium packs**, consult your battery's documentation for allowed C rates, before exceeding 1C charge rate.

NET / DUO FAQ

*** The discharge function** is supposed to be 10A Max, but when I discharged my 4S pack I got less current. Why?
Both charge and discharge functions are limited by both watts and amperage; **whichever comes first**.
Charge: 180W and 10A maxes per port
Discharge: 50W and 10A maxes per port
- If you are **discharging** a pack which starts at 10V, for example, the initial max current(A) would be: 50W/10V=5A (note that as the battery voltage drops during discharge, current will rise)
- If **charging** a pack which starts at 10V, then max current would be: 180W/10V=18A BUT, current is limited to 10A, so the max you get will be 10A, since the current limit is reached before wattage limit…

NOTE ALSO: Lithium batteries use CC/CV charge curves, so current will always fall as the battery becomes more charged.

*** Why does the charger not give the END buzzer** (or FLAT CHECK error), even though the pack has been attached for a long time? (I have checked and buzzer is set ON)
- LIPO/LiFePO4: Most likely, you have set a charge rate lower than 1C, and the charger cannot terminate CC/CV as required current at that point is too low. Assuming your battery is of decent quality and condition (if not, do NOT charge it!) there is NO reason to charge at rates below 1C. Charge again at 1C and observe results. Note also that END buzzer will NOT sound until the charger achieves target cell balance. For badly out-of-balance packs or large capacity packs, this could take up to an hour.
- NiCd/NiMH: Same answer as Lipo/LifePO4 above (for a different reason). Try charging at a higher rate. We have found that many NiMH packs on the market today are poorly made, and do not signal delta-v (indicating end charge) properly when charged at low rates, and sometimes even at higher rates. Try setting delta-v in your charger menu to a lower value. Try charging at a higher rate (check battery for over-temp!). If nothing works, get a pack of cells from a known quality brand (Sanyo, GP, etc) and test your charger.

*** Why do I see "0" current flowing** during charge at regular intervals? Is it a "Pulse" charger?
No, the 0610i simply pauses charging at intervals in order to make extremely accurate readings of cell/pack condition.

Troubleshooting

(1) Ensure that the battery you are trying to charge and the settings on the EOS 0610i DUOII match. Battery type (such as NiMH or LiPo), battery capacity, number of cells (charge voltage), and charge rate must all be correct.

(2) Check that the input cable and output cables:
*Have proper connectors and are in good condition *Are not frayed, worn, cut, or damaged
*Are the proper gauge (output 2.5mm, 14ga) *Are proper length <= 30cm (12") on output side

(3) Attach the charger input connectors to a 12V automotive battery that is in good condition and fully charged. Wiggle the terminal clips into the battery posts to insure that you have a good connection. Many charger problems are due to poor quality or inadequate switching AC-DC power supplies, so this test is necessary to eliminate those from the list of suspects.

(4) Try another battery for charging. If the RC battery is in poor condition, **over discharged**, or in some other way defective, the charger may correctly refuse to charge it based on safety algorithms.

(5) Try another RC battery type. For example switch to a NiMH battery if you are failing to charge Lithium types. Success with one type but failure with another generally indicates that the charger is working properly. The failing battery type is almost certainly in poor condition, wired incorrectly, or the charger may be improperly set.

(6) Contact your dealer with full details and description of the problem, including the type of input power source, RC battery type and cell count, and history of the charger - that is, has the charger been working properly before, or failed from new condition?

(7) I have an OUTPUT CIRCUIT ERROR
* Be sure that your pack balance connector type, polarity, and wiring system matches the multi-adapter attached to the charger.
* Carefully inspect pack connector, balance wire harness and Multi-Adapter for damage, wear, etc. If OK, then:
* Spray all connectors (including the one in charger) with de-oxide contact spray, then insert-remove connectors several times, then spray one last time and re-connect.
* Use a solid DC PS or fully charged CAR battery for Input power (poor power supplies cause MANY problems…)
* Test charger using a lithium battery known to be in good condition.
* Try a different brand battery (preferably with different balance connector and multi-adapter type)

8) My LCD does not light, or lights but no characters are visible.
In most cases this happens when a charger has been dropped, or suffered some heavy vibration. The ribbon cable between LCD unit and charger can become loose. Have your dealer open the charger and re-seat the ribbon cable.

Enjoy the Power!

The Hyperion Team

WARRANTY
HYPERION Chargers are guaranteed to be free from defects in materials and workmanship for a period of one calendar year from date of purchase. Your selling dealer is your first point of contact for warranty issues. Return postage costs are the responsibility of the user in all cases. Submit copy of original receipt with the return. Damage due to physical shock (dropping on the floor, etc), connection errors due to unauthorized configurations [two batteries attached to a single port, for example] inappropriate power supply [automotive battery charger, etc!], water, moisture, and humidity are specifically NOT covered by warranty. It is well to carefully check your charger before making a return, as problems in setup, cabling, batteries, or power supply are much more common than defects in the charger.